



**Wharf Resources (USA), Inc.**

May 25, 2011

Mr. Matt P. Hicks  
Ground Water Quality Program  
SD DENR  
Joe Foss Building  
523 East Capitol  
Pierre, South Dakota 57501

**RE: Reply to Technical Review, American Eagle Ground Water Discharge Permit Application**

Dear Mr. Hicks:

In response to your Technical Review letter of May 12, 2011, I submit the following to address your comments:

1. MW-59 was not intended to be used as a compliance point and I have attached a modified monitoring schedule to reflect the corrected change.
2. Wharf Resources current ARD Management Plan outlines proper handling and blending procedures to ensure the material is blended with sufficient net neutralizing material to suppress any acid generation.

The ARD Management Plan is based on geological and geochemical analyses determining rock type characteristics. The analyses include drill hole logging, geological mapping and numerous types of geochemical testing (ABA, Humidity Cells, NAG pH's). The information combined with computer modeling will ensure the implementation of a proper mitigation plan for any identified PAG material.

The management plan for potential acid generating material will be based on having a sufficient volume of neutralizing material and ample blending of the material. The set criteria to determine net neutralizing capacity will be based on industry standards to categorize ABA data into low, moderate, and high potential acid generating categories. The standards are as follows.

Low AGP Material = 3:1 NP:AP ratio, and ABA (NNP)>20

Moderate AGP Material = 2:1 NP:AP ratio, and 20>ABA>-20

High AGP Material = 1:1 NP:AP ratio, and ABA<-20

The ARD Management Plan will begin with a standard blending procedure for the material mined. The blending procedure will help to assure a positive net neutralizing potential capacity (NNP) through the normal mining procedures for blasting, mucking, crushing, and loading of the material.

The blending of the material begins with the blasting of the material. For the average shot, there will be approximately twelve feet of movement at the crest of a twenty-foot bench shot, with less at the toe, thus creating blending. The next step in blending is the mucking of the material with the use of front-end loaders and 100-ton haul trucks. Blending is enhanced by the angle of the muck face and the constant slumping of material off the crest, as well as the mucking and

loading of the material by the loaders to the haul trucks. Once the material is loaded, it is transported to the crusher. The material is dumped either directly into the crusher hopper or to the crusher stockpile. Material is again blended as it is dumped, and additional material is dumped on top of it, and as the material is worked to maintain a manageable stockpile. In addition, the stockpile will usually maintain a blend of Deadwood sediments and monzonite porphyry to maximize the crushing and leaching efficiency.

The material is again blended when mucked from the stockpile to the crusher hopper and again in the crushing process. In addition, the crushed ore has lime added to maintain an alkaline pH for processing. Once the rock goes through the crushing procedure, it is dumped from a conveyor belt into piles of approximately 10,000 tons in the form of cones, blending the material again as the cones are formed. From the crushed piles, the crushed ore is blended as it is loaded into the haul trucks for dumping on the leach pads. Once on the leach pad, the material is blended for the final time as it is dozed to create 20-foot lifts to be dripped and leached.

#### Pad Off-Load Management Plan

It is highly unlikely and not expected that any material will have the ability to generate acid once the unload of the material begins. Constant monitoring of the ore material from pit to crusher, to pad load, and through the leaching process, will ensure that all the material is sufficiently blended and has neutralizing capacity.

The unload of the pads will begin another step in blending the material through normal mining practices. It begins with mucking and loading of the spent ore from the pads. The mucking procedure begins by cutting material out of the pad from the bottom lift to establish a loading area. The established muck face will range in height from one to several lifts exposed, each lift being 20 feet in height. A dozer is used to push material from the top lift over the muck face to the loading area, where the loader will begin loading the trucks. This standard practice creates blending through the constant moving and loading of the material. Once the material is loaded, it is transported to the designated spent ore depository. The depositories are designed to have the material dumped over a dump face, creating an advancing face. This process finishes the blending and reworking of the spent ore material.

#### Ore Management Plan

If ore material is identified as having the potential to generate ARD, it will be segregated at the time of mucking. The material will be transported to the crusher hopper hill where it will be blended by a loader and/or dozer with material of a net neutralizing capacity to obtain a weighted NP:AP ratio of greater than 3. The blending of the materials will ensure that the net neutralizing capacity is adequate to suppress any acid generation. The material selected for blending will be based on geological knowledge of the rock types, ABA modeling of the rock types and their NP, AP, and Sulfur %, and muck face mapping that includes sampling and paste pH testing.

#### Non-Ore Management Plan

The management plan for non-ore material that shows a potential to generate acid will go through the standard blending that results from normal mining

procedures, except the material will go to a backfill or depository area. It will see additional blending as it is deposited over the dump embankment. The material is then dozed to maintain an advancing dump face where additional blending will occur.

Identified PAG material will undergo additional blending at the backfill/depository area or at the active mining area with material of a NNP value to assure a NNP blend and 3:1 NP:AP ratio for all the material. The material used for blending will be stockpiled either at the depository or at the active mining area. This material will be identified with sufficient NNP to maintain proper blending with PAG material. The PAG material will be thoroughly blended at the site with the use of a dozer, spreading the material out and working in additional NNP material.

3. In 1996, Adrian Brown performed laboratory studies of the arsenic attenuation in the bedrock underlying the Wharf Mine. The results of these laboratory studies are presented in Appendix B of the "Performance Evaluation of Spent Ore Disposal in Juno Pit" (Adrian Brown, 1996). The principal saturated bedrock unit underlying the American Eagle Pit is the Precambrian phyllite. Adrian Brown (1996) reports Kd values for arsenic the Precambrian phyllite ranging from 3.51 to 4.81 L/kg (Adrian Brown, 1996, Table B.5). Based on the studies by Adrian Brown (1996), a conservative Kd value of 3.0 L/kg for arsenic attenuation was used for in the solute transport simulations. A copy of Table B.5 from the Adrian Brown (1996) report is attached

Arsenic has been detected at concentrations near or above the 0.010 mg/L regulatory standard in monitoring wells MW-41 and the Joseph Well in the Cleopatra Creek drainage, and in monitoring wells MW-42 and MW-43 in the False Bottom Creek drainage. The arsenic detections in MW-41 and the Joseph Well occurred prior to the first spent ore disposal in the Juno Pit in 1997, and no spent ore has been placed in the Trojan Rock Facility or Trojan Pit up gradient of MW-42 and MW-43. Therefore, the arsenic detected in these wells is believed to be derived from dissolution of arsenic-bearing minerals in the Precambrian bedrock in which these monitoring wells are screened.

4. Wharf has modified our sampling protocol according to your comments. The modified sampling protocol is attached.
5. I have attached a revised Figure 1 which shows the location of the proposed spent ore and barren/waste rock disposal area boundary. Figure 6-1 shows the disposal area in reference to the pits and Figure 7-1 merely shows the different pit areas.

If you have any questions or comments, please don't hesitate to give me a call at (605) 584-4155.

Sincerely,



Ron Waterland  
Environmental Manager

Xc: Mike Cepak, Minerals and Mining Program, SD DENR



be low due to their non-adsorptive nature, the results are not considered as reliable as those for the other materials in section B4.1.1, because only one arsenic-laden solution was used in the experiments. This reduces the number of points from which the slope ( $K_d$ ) is determined, including the point (0,0), from three to two and, thus, is not as definitive. However, the results do represent the adsorption behavior of the solids and shows them to be significantly diminished relative to soil.

Table B 5.  $K_d$  values (L/kg) for bedrock material beneath Juno Pit.

Solid-solution Ratio	Monzonite	Basal Quartzite	Phonolite	Precambrian Phyllite
1:2	1.48	3.33	3.79	3.51
1:5	1.56	4.30	2.78	4.04
1:10	2.31	6.67	4.81	4.81
<b>Average</b>	1.78	4.77	3.79	4.12

#### B4.1.3 Spent ore adsorption and rinse testing

The arsenic adsorption behavior of spent ore was evaluated thoroughly as this material is the vehicle by which arsenic will report to the Juno Pit. The total arsenic load associated with this material is directly dependent on its  $K_d$  value. This material was characterized by the same approaches used for other material, described above. Further, it was characterized by recovering the original arsenic load of this material by thoroughly washing with 1M  $MgCl_2$  to displace adsorbed arsenic, and with three washings of distilled water. In all instances, a solid-solution ratio of 1:5 was employed. Table B 6 reports the results of spent ore  $K_d$  determination and Table B 7 reports the results of the rinse testing.

Table B 6.  $K_d$  values (L/kg) for three samples of spent ore.

Solid:solution Ratio	Spent Ore	Spent Ore (fully rinsed)	Spent Ore (pad #2)
1:5	0.74	0.98	0.67
1:10	1.49	-	0.91
1:15	2.01	-	-
1:20	2.75	-	-
<b>Average</b>	1.75	0.98	0.79

**STANDARD OPERATING PROCEDURE**

**SAMPLE PRESERVATION, STORAGE,  
HANDLING AND DOCUMENTATION**

Modified from

**U.S. Environmental Protection Agency Environmental Response Team**  
**Response Engineering and Analytical Contract**  
**Standard Operating Procedures**  
**Sample Preservation, Storage, and Handling**  
**SOP 2003, Rev. 2.0, 1/9/92**

## TABLE OF CONTENTS

	Page
1.0 SCOPE AND APPLICATION.....	1
2.0 METHOD SUMMARY .....	1
3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE.....	1
3.1 Sample Preservation and Storage.....	1
3.2 Chain-of-Custody Procedures.....	2
4.0 INTERFERENCES AND POTENTIAL PROBLEMS.....	4
5.0 EQUIPMENT/APPARATUS.....	5
6.0 PROCEDURES .....	6

## LIST OF TABLES

1. Examples of sample containers, volumes to be collected and preservatives by parameter and matrix.....	8
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## **1.0 SCOPE AND APPLICATION**

The purpose of this Standard Operating Procedure (SOP) is to provide general guidelines for the preservation, storage, and handling of water and soil/sediment samples. Requirements for sample volume, container type, and preservation techniques for sample preservation, storage, and handling must be established prior to sample collection.

The methods described in this SOP are typically applicable operating procedures which may be varied or changed as required, dependent upon site conditions or equipment limitations. In all instances, the procedures employed should be documented in the site logbook and associated with the final report.

## **2.0 METHOD SUMMARY**

Proper techniques of preserving, storing, and handling air, water and wastewater samples are critical if the integrity of the samples are to be maintained.

## **3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE**

### **3.1 Sample Preservation and Storage**

Samples should be collected using equipment and procedures appropriate to the matrix, the parameters to be analyzed, and the sampling objective. The volume of the sample collected must be sufficient to perform the analysis requested, as well as the quality assurance/quality control requirements. Depending on the arrangements for sample analysis and the amount of sample required for the analysis, it is possible that aliquots for several analyses may be taken from the same sample container. The laboratory performing the analysis should be contacted to confirm the requirements for sample volumes, container types, and preservation techniques.

Table 1 contains examples of parameters which are typically of interest in environmental site investigations and indicates the required sample volume, the proper types of containers, and the preservation method for water and soil/sediment samples. All samples must be cooled to 4°C from the time of collection until analysis.

All sample containers must be clean and labeled appropriately. To prevent leakage of aqueous samples during shipping, sample containers should be no more than 90 percent full. If air space would affect sample integrity, such as with VOC samples, fill the sample container completely and place the container in a second container to meet the 90 percent requirement. The exterior of the sample containers must be wiped clean and dry prior to sample packaging.

Prior to the sampling of water or wastewater, sample containers must be pre-rinsed with the sample water two or three times prior to sample collection. *Do not pre-rinse the bottle if it already contains a preservative or dechlorinating agent.* When required, preservative is added in the field immediately after the sample is collected. Preservative vials obtained from the laboratory already contain the proper amount of preservative to be added to each sample

container. If the laboratory-supplied preservative is not available, contact the laboratory to determine the proper amount of preservative to use.

All samples must be packaged according to the requirements of U.S. Department of Transportation (U.S. DOT) or International Air Transportation Association (IATA).

Most of Wharf's samples are sent to same laboratory. At the time of collection, the sample containers are placed in a large cooler filled with loose ice. When the cooler is ready to ship, the proper paperwork (parameter sheets) and chain-of-custodies are prepared and placed in the cooler, the cooler is then taped shut and transported to the laboratory.

For more information regarding water sample collection, refer to the Sampling Procedures section in this document.

### **3.2 Chain-of-Custody Procedures**

To establish the documentation necessary to trace sample possession, a Chain-of-Custody Record must be filled out and accompany each set of samples. The record should accompany the water quality data form and the samples to the laboratory. This record documents sample custody transfer from the sampler to the analyst at the laboratory. At a minimum, the record should contain: sample identification; the signature of the collector; the date and time of collection; place and address of collection; substance sample; signature of persons involved in the chain of possession; and, inclusive dates of possession. Samples will be packaged properly for shipment and dispatched to the appropriate laboratory for analysis.

All shipments will be accompanied by the Chain-of-Custody Record identifying its contents. The original record will accompany the shipment, and a copy will be retained by the project leader.

The laboratory should have an assigned laboratory custodian and an alternate who are responsible for overseeing the reception of all custody samples.

### **4.0 INTERFERENCES AND POTENTIAL PROBLEMS**

The following are interferences or potential problems associated with sample preservation, storage, and handling:

- Samples should be protected from sunlight which may initiate photodegradation of sample components.
- Delaying sample preservation may cause chemical reactions to occur, altering original sample composition.
- Improper sample preservation may adversely affect analytical results.
- Inadequate sample volume may prohibit the appropriate analyses from being performed.
- Samples can become contaminated if they come in contact with human flesh; therefore, appropriate protective gloves (i.e., rubber, latex, or plastic) should be worn at all times during sampling collection and preservation.
- Samples can also become contaminated from equipment used to collect and preserve the

sample; therefore, all sample collection and preservation equipment must be kept clean.

## **5.0 EQUIPMENT/APPARATUS**

The following specific equipment/apparatus is required to be taken in the field for proper sampling and preservation:

Coolers with loose ice	Pen
pH meters	Felt Tip Marker
Conductivity meters	Keys for Well Cap locks
Temperature meters	Bailer
ORP meters	Bottle of deionized water
Dissolved Oxygen (DO) meters	Nitrile gloves
Water level indicator	Disposable water filter capsules or
Glass and plastic bottles (various sizes)	Water filter barrel and Filters
Preservatives (acids, bases, and ice)	Bottle labels
Flow meter	Two-way radio and/or cell phone
Tape measure	
Watch	
Field Book	

## **6.0 SAMPLING PROCEDURES**

Calibrate the meters to be used that day each morning prior to sampling. Refer to the calibration manuals supplied with the meters. Record the date, time and meters calibrated in the Calibration book. Refer to the manuals for operation of the meters.

Calibrate the chlorine meter and take the meter into the field, if hypochlorite is being utilized and the treated water is being discharged to any of the Surface Water Discharge compliance points or outfalls.

### **6.1 SURFACE WATER AND SURFACE WATER DISCHARGE PERMIT SAMPLING:**

Always start at the furthest downstream location and work your way upstream.

1. Record in field book: sample location, date and time.

For Surface Water Discharge Permit sampling also record in the field book:

- Air Temperature
- Sky Conditions
- Wind Conditions
- Precipitation
- if visible pollutants include an oil sheen
- Turbidity
- Flow conditions

- Total Residual Chlorine test results if hypochlorite is being utilized and the treated water is being discharged.
2. Prior to sampling, label the sample bottles with location, site name, analyses to be performed (minerals, metals, nutrients, etc.), date and time. Labels are provided by the testing laboratory.
  3. Take pH, conductivity, temperature, ORP, and DO readings of the sample solution and record the results in the field book. The meters may be placed directly in the stream. The meters should not be placed into the sample collection bottle. If these meters need to be placed into a bottle to obtain a reading, a separate bottle should be used. Use deionized water to rinse the meters in between measurements to prevent cross-contamination.
  4. *Be careful not to touch the inside of the bottles or caps at any time.* Rinse all sample bottles two or three times with sample solution. Collect sample in the rinsed bottles and cap immediately.
    - a. If safe, collect the sample from the middle of the stream. If unsafe, collect the sample while standing on the bank and reach out into the stream.
    - b. Collect the sample facing upstream, so that the sample entering the bottle has not been influenced by any of your actions.
    - c. Plunge the bottle to just below the surface of the water and allow to fill.
    - d. Do not stir up sediment from the stream bottom when sampling.
  5. Once aqueous samples are collected and before moving to the next site: filter the sample bottles if necessary; add the appropriate preservative to reach the desired pH; then place sampled in a cooler containing loose ice. If using filter barrel, rinse with deionized water between each sample to prevent cross-contamination.
  6. Use the flow meter, portable flume, or flume to obtain a flow measurement and record the reading into the field book.

Check the area around the site for any changes from nature or vandalism. Record the changes in the field book. Notify supervisor if vandalism was observed.

## 6.2 WELL SAMPLING

1. Record in field book: sample location, date and time
2. Remove lock from well cap and remove the well cap. Using the water level indicator, measure the water level in the well. Record depth in the field book.
  - a. Measure the depth from the point marked on the well casing to water to the nearest 0.01 feet.
  - b. Wipe off probe

3. Prior to sampling, label the sample bottles with location, site name, analyses to be performed (minerals, metals, nutrients, etc.), date and time. Labels are provided by the testing laboratory.
4. Each well should have a pump installed in it or a dedicated bailer. Calculate the amount of time to purge well of three well volumes and purge well for that amount of time; or take a pH reading from the water purging from the well every 2 to 3 minutes during pumping. When three consecutive reading stabilize ( $\pm 0.5$  units), water sampling may commence. Begin pumping or bailing the well.
5. Take pH, conductivity, temperature, ORP, and DO readings of the sample solution and record the results in the field book. The meters should not be placed into the sample collection bottle. If these meters need to be placed into a bottle to obtain a reading, a separate bottle should be used. Use deionized water to rinse the meters in between measurements to prevent cross-contamination.
6. *Be careful not to touch the inside of the bottles or caps at any time.* Rinse all sample bottles two or three times with sample solution. Collect sample in the rinsed bottles and cap immediately.
7. Replace the cap and lock on the well.
8. Once aqueous samples are collected and before moving to the next site: filter the sample bottles if necessary; add the appropriate preservative to reach the desired pH; then place sampled in a cooler containing loose ice.

Check the area around the site for any changes from nature or vandalism. Record the changes in the field book. Notify supervisor if vandalism was observed.

**EXAMPLES OF SAMPLE CONTAINERS, VOLUMES TO BE COLLECTED, PRESERVATIVES AND HOLDING TIMES BY PARAMETER AND MATRIX**

**TABLE 1**

Parameter	Matrix <sup>2</sup>	Container <sup>3</sup>	Volume to be Collected	Preservative	Holding Times
Acidity/Alkalinity	W	P or G	500 ml	Cool (4°C)	14 days
Acidity/Alkalinity	S	P or G	224 grams	Cool (4°C)	14 days
BNA	W	G (amber)	2 x 1 liter	Cool (4°C)	7 days until extraction, 40 days after extraction
BNA <sup>4</sup>	S	G	224 grams	Cool (4°C)	14 days until extraction, 40 days after extraction
BOD	W	P	1 liter	Cool (4°C)	2 days
COD	W	P or G	1 liter	Cool (4°C), H <sub>2</sub> SO <sub>4</sub> , pH<2	28 days
Cr <sup>+6</sup>	W	P	200 ml	Cool (4°C)	24 hours
Creosotes <sup>4</sup>	W	G	2 x 1 liter	Cool (4°C)	?
Creosotes	S	G	224 grams	Cool (4°C)	?
Cyanide <sup>4</sup>	W	P	125 ml	Cool (4°C), NaOH, pH>12	14 days
Cyanide	S	G	224 grams	Cool (4°C)	14 days
Dioxin/Furans	W	G	2 x 1 liter	Cool (4°C)	7 days until extraction, 40 days after extraction
Dioxin/Furans	S	G	448 grams	Cool (4°C)	?
Herbicides <sup>4</sup>	W	G	2 x 1 liter	Cool (4°C)	7 days until extraction, 40 days after extraction
Herbicides	S	G	224 grams	Cool (4°C)	14 days until extraction, 40 days after extraction
Mercury (Hg)	W	P or G	250 ml	Cool (4°C), HNO <sub>3</sub> , pH<2	28 days
Mercury (Hg)	S	P or G	224 grams	Cool (4°C)	28 days
Metals (except Cr <sup>+6</sup> and Hg)	W	P or G	250 ml	Cool (4°C), HNO <sub>3</sub> , pH<2	6 months
Metals (except Hg)	S	G	224 grams	Cool (4°C)	6 months
Oil and Grease	W	G	2 x 1 liter	Cool (4°C), H <sub>2</sub> SO <sub>4</sub> , pH<2	28 days
Oil and Grease	S	G	224 grams	Cool (4°C)	28 days
Petroleum Hydrocarbons <sup>4</sup>	W	G	2 x 1 liter	Cool (4°C), H <sub>2</sub> SO <sub>4</sub> , pH<2	14 days
Petroleum Hydrocarbons	S	G	224 grams	Cool (4°C)	14 days

TABLE 1 (cont.)

Parameter	Matrix <sup>2</sup>	Container <sup>3</sup>	Volume to be Collected	Preservative	Holding Times
Pesticides/PCBs <sup>4</sup>	W	G (amber)	2 x 1 liter	Cool (4° C)	7 days until extraction, 40 days after extraction
Pesticides/PCBs	S	G	224 grams	Cool (4° C)	14 days until extraction, 40 days after extraction
Phenols	W	G	1 liter	Cool (4° C), H <sub>2</sub> SO <sub>4</sub> , pH<2	7 days until extraction, 40 days after extraction
Phenols	S	G	224 grams	Cool (4° C),	14 days until extraction, 40 days after extraction
Polynuclear Aromatic Hydrocarbons <sup>1</sup>	W	G	1 liter	Cool (4° C),	7 days until extraction, 40 days after extraction
Polynuclear Aromatic Hydrocarbons	S	G	224 grams	Cool (4° C),	14 days until extraction, 40 days after extraction
Reactivity (RCRA) (Cyanide)	W	P	1 liter	Cool (4° C), NaOH, pH>12	?
Reactivity (RCRA) (Sulfide)	W	P	1 liter	Cool (4° C), 4.0 ml zinc acetate solution	?
Reactivity (RCRA) (Cyanide/Sulfide)	S	G (amber)	224 grams	Cool (4° C),	?
Corrosivity (RCRA)	W	P	500 ml	Cool (4° C)	?
Ignitibility (RCRA)	W	G (amber)	500 ml	Cool (4° C)	?
Ignitibility (RCRA)	S	G (amber)	224 grams	Cool (4° C)	?
TCLP-VOCs <sup>5</sup>	W	G	3 x 40 ml vials	Cool (4° C)	?
TCLP-BNAs	W	G (amber)	2 x 1 liter	Cool (4° C)	?
TCLP-Pesticides/Herbicides	W	G (amber)	2 x 1 liter	Cool (4° C)	?
TCLP-Inorganics	W	P	1 liter	Cool (4° C), HNO <sub>3</sub> , pH<2	?
TCLP-Nonvolatile Extraction <sup>6</sup>	S	G	448 grams	Cool (4° C)	?
TCLP-Volatile Extraction <sup>6</sup>	S	G	448 grams	Cool (4° C)	?
TOC	W	P or G	500 ml	Cool (4° C), H <sub>2</sub> SO <sub>4</sub> , pH<2	28 days
TOC	S	G	224 grams	Cool (4° C)	?
TOX	W	G	300 ml	Cool (4° C)	28 days
TOX	S	G	224 grams	Cool (4° C)	?

**TABLE 1 (cont.)**

<b>Parameter</b>	<b>Matrix<sup>2</sup></b>	<b>Containers<sup>3</sup></b>	<b>Volume to be Collected</b>	<b>Preservative</b>	<b>Holding Times</b>
VOCs <sup>6</sup>	W	G	3 x 40 ml vials	Cool (4°C)	14 days
VOCs	S	G	40 ml vial	Cool (4°C)	14 days

1 Subcontract laboratory requirements may vary. Verify prior to sample collection.

2 W - water, S - soil/sediment

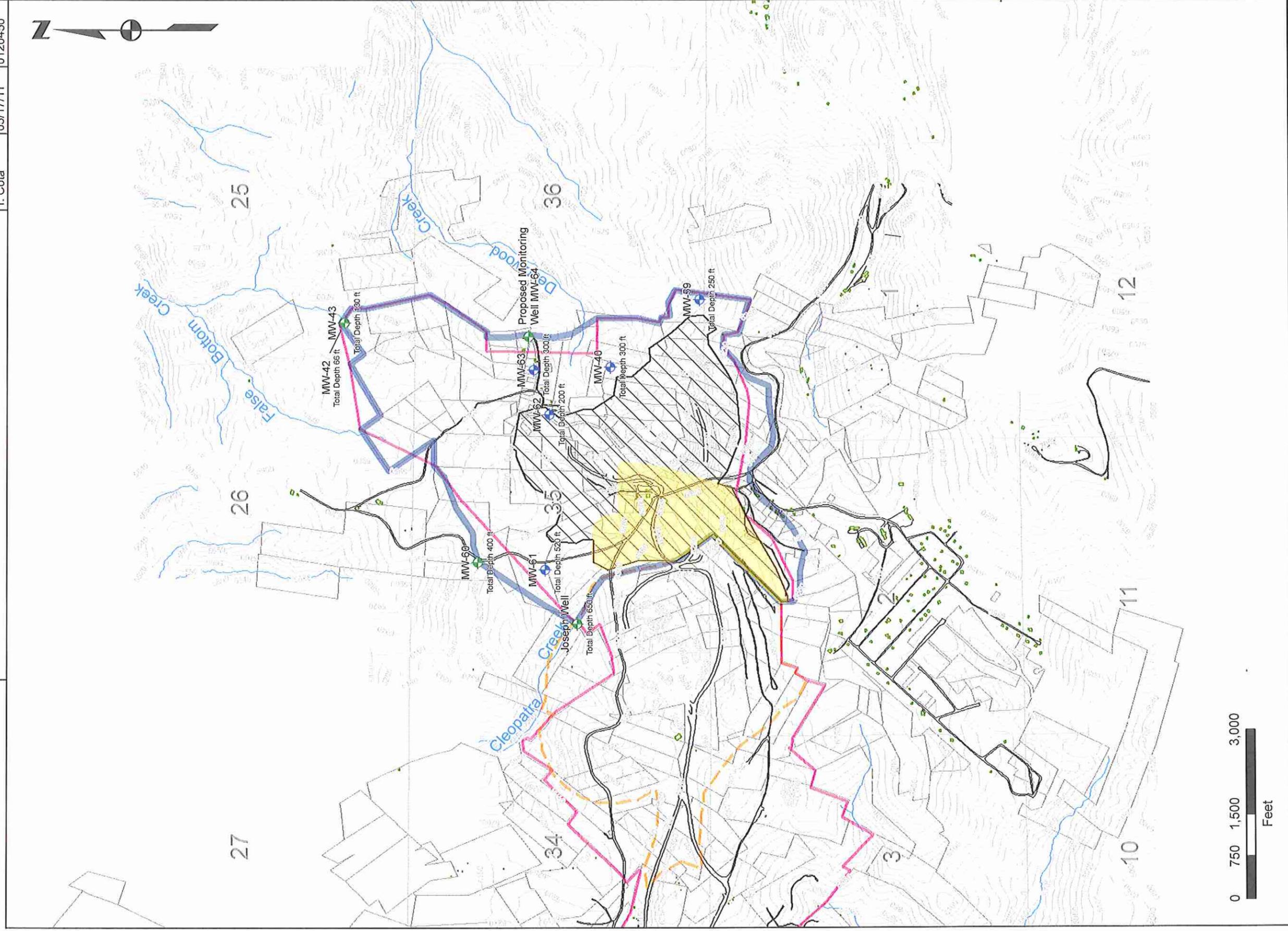
3 P - polyethylene, G - glass

4 For one sample of every batch of 10 (or less) samples, collect two additional 1 liter volumes for MS/MSD analysis.

5 Avoid excessive turbulence when filling the sample container. The container must be sealed so that no air bubbles are entrapped. No headspace allowed.

6 For one sample of every batch of 10 (or less) samples, collect two additional 16-ounce volumes for MS/MSD analysis.

7 For drinking water samples, if residual chlorine is present, the sample should be preserved with 0.008 percent sodium thiosulfate. U.S. Environmental Protection Agency Methods 330.4 and 330.5 may be used for measurement of residual chlorine. Field-test kits are commercially available for this purpose.



SOURCE: Base map provided by Wharf Resources (U.S.A.), Inc., May 2008.

**LEGEND**

- Proposed Perimeter of Operational Pollution
- Proposed Spent Ore Disposal Area
- Existing and Proposed Barren Rock Disposal Area
- Juno-Foley Perimeter of Operational Pollution
- Point of Compliance Well
- Existing Monitoring Well
- Structures
- Roads
- Streams
- Wharf Land Ownership
- Mining Permit Boundary

**Figure 1**  
**Postclosure Monitoring Plan**  
**American Eagle/Deep Portland Pit**  
**Wharf Mine**  
**Wharf Resources**  
**10928 Wharf Road**  
**Lead, South Dakota**  
 ERM 05/11